The relationship between heart and stomach in Iranian traditional medicine: a new concept in cardiovascular disease management

Meysm Shirzad a,b,⁎, Mahmoud Mosaddegh a,b, Bagher Minaii c, Alireza Nikbakht Nasrabadi d, Mohammad Mahdi Ahmadian-Attari a,b

a Department of Iranian Traditional Medicine, School of Traditional Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran
b Traditional Medicine and Materia Medica Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran
c Department of Iranian Traditional Medicine, School of Traditional Medicine, Tehran University of Medical Sciences, Tehran, Iran
d School of Nursing and Midwifery, Tehran University of Medical Sciences, Tehran, Iran

⁎ Corresponding author at: Department of Iranian Traditional Medicine, School of Traditional Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran.
Tel.: +98 2188773521; fax: +98 2188776027.
E-mail address: shirzadm@gmail.com (M. Shirzad).

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In Iranian Traditional Medicine (ITM) the heart and the stomach are organs deemed to be related, in terms of clinical manifestations and the etiologic basis of disease. Persia’s renowned physicians, Razes (Al-Razi: 865–925 A.D.) and Avicenna (Ibn Sinâ: 980–1037 A.D.), considered the association (moshâreke) between heart and stomach in a number of ailments. According to their manuscripts, in some gastric conditions the stomach has serious effects on the heart. These conditions include ‘dystemperament’ (sū’-e mizaj, the abnormal character of the organ) and the appearance of an abnormal humour (khilt-e radî) in the stomach [1,2]. In the context of mainstream medicine, these abnormalities are usually seen in gastro-esophageal reflux disease (GERD), dyspepsia and some forms of acid peptic disorders.

Avicenna and Razes believed that the cardiovascular manifestations appearing in gastric diseases include chest pain (waja al-fold), palpitation (khafaqân), and syncope (ghashi). Chest pain is usually severe and located in the substernal or epigastric region. In some cases, it is accompanied by cold extremities, anxiety, and fainting attacks. Palpitation is often accompanied by an irregular pulse (sū’-a al-nabz), suggesting dysrhythmia. And syncope occurs when a severe dystemperament and/or swelling appears in the esophagus or stomach. In this case the condition could be fatal [1,2].

In modern times, an etiologic relationship between cardiac and gastric diseases has also been observed. In the past three decades there have been several studies on the effect of esophageal-gastric ailments on coronary artery disease (CAD). Studies indicate that GERD occurs more frequently in patients with CAD than in the general population. Apart from CAD, GERD and esophageal motility disorders are the second most frequent causes of chest pain. GERD has also been introduced as a cause for myocardial ischemia in CAD patients [3,4]. In this case, impairment of myocardial perfusion results from esophageal mucosal exposure to acid and reduction in lower esophageal sphincter pressure [5]. Moreover, chest pain attacks due to reduction in coronary blood flow have been provoked by esophageal acid perfusion tests [6]. Acid-derived esophageal/cardiac reflex is known as the trigger of a myocardial ischemic attack, by diminishing the coronary perfusion, the phenomenon known as “Linked-angina” [3,7]. Additionally, new studies verify the effect of GERD on atrial rhythm, which presents with palpitation. Nowadays, the association between atrial fibrillation (AF) and GERD has been well documented in several studies. Based on this, acid-suppressive therapy is recommended for the management of AF and may help to minimize the use of anti-arrhythmic agents [8,9]. GERD may also play a role in the induction of vasovagal syncope. In this regard, a number of reports consider acid reflux disease as a potential cause of syncope [10,11].

Iranian traditional physicians have introduced several remedies for heart–stomach association ailments. Treatment consists of two phases. In the first step, remedies focus on eliminating the culprit from both original and associate organs i.e. the stomach, the heart and blood vessels, respectively. These remedies include medicinal foods, herbal medicines and manual interventions such as cupping, venesection and massage. The second step is organ reinforcement, which is achieved by suitable natural medications [12].

The concept of a relationship between gastroesophageal and cardiovascular diseases, which has been emphasized in mainstream medicine during recent decades, is well discussed in ITM texts. Studies in this area could clarify the pathophysiologic mechanisms of common disorders between the two organs. Considering this concept, therefore, could increase the potential for the introduction of new treatments in cardiovascular diseases.

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References
Detection of acute aortic dissection by extremely high soluble lectin-like oxidized LDL receptor-1 (sLOX-1) and low troponin T levels in blood

Nobuaki Kobayashi a,*, Noritake Hata a, Noriaki Kume b, Shinya Yokoyama a, Masamichi Takano c, Takuro Shinada a, Kazunori Tomita a, Akihiro Shirakabe a, Toru Inami c, Yoshihiko Seino c, Kyoichi Mizuno d

a Division of Intensive Care Unit, Chiba-Hokusoh Hospital, Nippon Medical School, Chiba, Japan
b Division of Clinical Pharmacy, Faculty of Pharmaceutical Sciences, Kobe Gakuin University, Kobe, Japan
c Cardiovascular Center, Chiba-Hokusoh Hospital, Nippon Medical School, Chiba, Japan
d Division of Cardiology, Nippon Medical School, Tokyo, Japan

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Acute aortic dissection (AAD) is a potentially critical cardiovascular emergency and would lead to high mortality without rapid diagnosis and appropriate treatment. D-dimer measurement has been established as a standard method to diagnose AAD because of its high sensitivity [1]. However, the diagnostic specificity appears to be insufficient, and, especially, it is not useful to make a differential diagnosis between AAD and acute myocardial infarction [2]. Therefore, the value of D-dimer is no more than a screening tool to rule out AAD [2]. Measurement of other suitable biomarkers, in combination with D-dimer, would be necessary to improve diagnostic accuracy for AAD. Because differentiation of AAD from acute coronary syndrome (ACS), especially non-ST elevation ACS (NSTEMACS), is difficult [3]; Lectin-like oxidized LDL receptor-1 (LOX-1), a receptor for atherogenic oxidized LDL, is abundantly expressed in advanced human atherosclerotic lesions [4], which is cleaved at the membrane-proximal extracellular domain by proteases and released as a soluble form [5]. Therefore, soluble LOX-1 (sLOX-1) is regarded as a biomarker for plaque rupture and vulnerable plaques, which can be used to diagnose ACS at the early stage [6–8]. We hypothesized that sLOX-1 expressed on human atherosclerotic aorta was cleaved and released as sLOX-1 by dissection of aortas with atherosclerotic plaques, and that circulating blood sLOX-1 levels are elevated in patients with AAD at the early stage. If this is the case, we would be able to use sLOX-1 to diagnose AAD in the ER. The aim of the present study is to clarify the diagnostic accuracy of plasma sLOX-1 levels in the ER for the patients with AAD. Consecutive patients with AAD (n = 19) and those with NSTEMACS (n = 39) admitted to the ER between December 2009 and December 2010 were prospectively enrolled. AAD and ACS were conclusively diagnosed by contrast enhanced computed tomography and coronary angiography, respectively. NSTEMACS was defined as ACS without ST segment elevation (≥0.1 mV) in two or more contiguous leads on electrocardiography. Another set of 35 patients without significant coronary artery stenosis among consecutive patients who underwent coronary angiography were enrolled as a control group. Peripheral blood samples to measure plasma sLOX-1 and serum conventional troponin T (TnT) levels were obtained from the patients with AAD and NSTEMACS in the ER and from control patients immediately before coronary angiography. Plasma sLOX-1 levels were measured using a sandwich chemiluminescent enzyme immunoassay (CLEIA) with two anti-human LOX-1 monoclonal antibodies [9]. Serum TnT levels were measured using conventional fourth-generation assay (Roche Diagnostic Ltd) and the lower detection limit of this assay was 0.01 ng/mL. Undetectable TnT levels (<0.01 ng/mL) were regarded as 0.01 ng/mL in the present study. Continuous variables are presented as means ± standard deviation and were compared using Student’s t-test. Dichotomous variables were compared using χ² statistics. Levels of sLOX-1 and TnT were compared by the Mann-Whitney’s U-test because they did not distribute normally. Values of sLOX-1 and TnT to differentiate AAD from control or NSTEMACS were evaluated by receiver operating characteristic (ROC) curves. Data were statistically analyzed using the SPSS software package, version 16.0. A p-value of <0.05 was considered to be statistically significant. The Ethics Committee of the hospital approved the study protocols, and written informed consent was obtained from all of the patients to participate in the investigations. The authors of this manuscript have certified that they comply with the Principles of Ethical Publishing in the International Journal of Cardiology. Patient characteristics of AAD, NSTEMACS and control groups are shown in Table 1. Prevalence of hypertension was higher in AAD group than in control group (p = 0.002). Dyslipidemia was more prevalent in

<table>
<thead>
<tr>
<th>AAD (n = 19)</th>
<th>NSTEMACS (n = 39)</th>
<th>Control (n = 35)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male; n (%)</td>
<td>9 (47)</td>
<td>27 (69)</td>
<td>21 (60)</td>
</tr>
<tr>
<td>Age; mean ± SD</td>
<td>69±13</td>
<td>67±11</td>
<td>62±12</td>
</tr>
<tr>
<td>Atherosclerotic risk factors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypertension; n (%)</td>
<td>17 (89)</td>
<td>32 (82)</td>
<td>16 (46)</td>
</tr>
<tr>
<td>Diabetes; n (%)</td>
<td>3 (16)</td>
<td>9 (23)</td>
<td>4 (11)</td>
</tr>
<tr>
<td>Dyslipidemia; n (%)</td>
<td>5 (26)</td>
<td>26 (67)</td>
<td>17 (48)</td>
</tr>
<tr>
<td>Smoking; n (%)</td>
<td>7 (37)</td>
<td>19 (49)</td>
<td>10 (29)</td>
</tr>
</tbody>
</table>

AAD; acute aortic dissection, NSTEMACS; non-ST elevation acute coronary syndrome, SD; standard deviation.

* p = 0.002 between AAD and control by χ² test.
† p = 0.001 between NSTEMACS and control by χ² test.
‡ p = 0.004 between AAD and NSTEMACS by χ² test.

* Corresponding author at: Intensive Care Unit, Chiba-Hokusoh Hospital, Nippon Medical School, 1715 Kamagari, Inzai, Chiba 270-1694, Japan. Tel.: +81 476 99 1111; fax: +81 476 99 1911.
E-mail address: s5047@nms.ac.jp (N. Kobayashi).